

**What is claimed:**

1. A process for producing electricity from carbonaceous materials comprising the steps of:

5 providing a fluidized bed containing a particulate material and a fluidizing medium, said fluidizing medium comprising steam;

combusting a fuel source in a combustion device to form a combustion stream, said combustion stream indirectly heating said fluidized bed;

10 feeding a carbonaceous material to said fluidized bed, said fluidized bed being at a temperature sufficient for said carbonaceous material to endothermically react with said steam to form a product gas stream;

15 feeding said product gas stream to a gas turbine, said gas turbine combusting said product gas stream in order to rotate a turbine and generate electricity, said gas turbine producing a flue gas stream;

20 feeding at least a portion of said product gas stream or said flue gas stream exiting said gas turbine to said combustion device for combustion with said fuel source; and

wherein prior to said gas turbine, the product gas stream is fed to a heat exchanger for heating steam fed to said fluidized bed.

2. A process as defined in claim 1, wherein  
5 said steam to said carbonaceous material have a weight ratio of from about 0.75:1 to about 3:1.

3. A process as defined in claim 1, wherein said combustion device is a pulse combustion device.

4. A process as defined in claim 1, further  
10 comprising the step of using said combustion stream to preheat an air stream that is fed to said combustion device for combusting said fuel source.

5. A process as defined in claim 1, wherein after exiting said fluidized bed, said combustion  
15 products are fed to a steam generator for generating steam fed to said fluidized bed.

6. A process for producing electricity from carbonaceous materials comprising the steps of:

providing a fluidized bed containing a  
20 particulate material and a fluidizing medium, said fluidizing medium comprising steam;

combusting a fuel source in a combustion device to form a combustion stream, said combustion stream indirectly heating said fluidized bed;

feeding a carbonaceous material to said  
5 fluidized bed, said fluidized bed being at a temperature sufficient for said carbonaceous material to endothermically react with said steam to form a product gas stream;

feeding said product gas stream to a gas  
10 turbine, said gas turbine combusting said product gas stream in order to rotate a turbine and generate electricity, said gas turbine producing a flue gas stream;

feeding at least a portion of said product  
15 gas stream or said flue gas stream exiting said gas turbine to said combustion device for combustion with said fuel source; and

wherein after exiting the fluidized bed, the combustion products are fed to a steam generator  
20 for generating steam fed to the gas turbine for increasing mass flow rates through the gas turbine.

7. A process as defined in claim 6, wherein said combustion device is a pulse combustion device.

8. A process as defined in claim 6, further comprising the step of using said combustion stream to preheat an air stream that is fed to said combustion device for combusting said fuel source.

5 9. A process as defined in claim 6, wherein prior to said gas turbine, said product gas stream is fed to a heat exchanger for heating steam fed to said fluidized bed.

10 10. A process for producing electricity from carbonaceous materials comprising the steps of:

providing a fluidized bed containing a particulate material and a fluidizing medium, said fluidizing medium comprising steam;

15 combusting a fuel source in a combustion device to form a combustion stream, said combustion stream indirectly heating said fluidized bed;

feeding a carbonaceous material to said fluidized bed, said fluidized bed being at a temperature sufficient for said carbonaceous material  
20 to endothermically react with said steam to form a product gas stream;

feeding said product gas stream to a gas turbine, said gas turbine combusting said product gas

stream in order to rotate a turbine and generate electricity, said gas turbine producing a flue gas stream;

combining an air stream with the product  
5 gas stream prior to combusting the product gas stream in the gas turbine, the air stream being preheated by the combustion stream exiting the combustion device;

preheating at least a portion of the flue  
gas stream exiting the gas turbine by the combustion  
10 stream exiting the combustion device; and

feeding at least a portion of said flue gas stream to said combustion device for combustion with said fuel source.

11. A process as defined in claim 10, wherein  
15 said carbonaceous material comprises a material selected from the group consisting of coal, pulp and paper waste, wood products, municipal waste, sewage, food waste, plant matter, animal waste, industrial waste, biomass and mixtures thereof.

20 12. A process as defined in claim 10, wherein said carbonaceous material comprises rice straw and wherein the process further comprises the step of

collecting silica as a byproduct from said fluidized bed.

13. A process as defined in claim 10, wherein said carbonaceous material comprises animal waste and  
5 wherein a material selected from the group consisting of phosphorous, nitrogen and potassium are generated and collected during the process.

14. A process as defined in claim 10, wherein said fluidized bed is maintained at a temperature of  
10 from about 900 degrees F to about 1800 degrees F.

15. A process as defined in claim 10, wherein said steam to said carbonaceous material have a weight ratio of from about 0.75:1 to about 3:1.

16. A process as defined in claim 10, wherein  
15 said combustion device is a pulse combustion device.

17. A process as defined in claim 10, wherein prior to said gas turbine, said product gas stream is fed to a heat exchanger for heating steam fed to said fluidized bed.

20 18. A process as defined in claim 10, wherein after exiting said fluidized bed, said combustion products are fed to a steam generator for generating steam fed to said fluidized bed.

19. A process as defined in claim 10, wherein said product gas stream is fed to a compressor prior to being combusted in said gas turbine, said compressor compressing said product gas stream to a pressure greater than the inlet pressure of said gas turbine.

20. A process as defined in claim 19, wherein said product gas stream is mixed with the preheated air stream prior to being combusted in said gas turbine.

21. A process as defined in claim 10, wherein after exiting said fluidized bed, said combustion products are fed to a steam generator for generating steam fed to said gas turbine for increasing mass flow rates through said gas turbine.

22. A process as defined in claim 10, wherein the flue gas exiting the gas turbine is fed to a steam generator for generating steam, said steam being fed to said gas turbine.

23. A process as defined in claim 10, wherein the air stream is fed to a compressor and compressed prior to being preheated by the combustion stream exiting the combustion device.